NOTES FOR STUDENTS.

ITEMS of taxonomic interest are as follows: Illustrations of *Hypericum galioides*[12] and *H. lobocarpum*[13] have appeared in recent numbers of *Garden and Forest.* W. W. Ashe[14] has prepared a synoptical presentation of the genus Asarum in eastern America, recognizing eight species, four of which are described as new. E. L. Greene[15] has published a fascicle of new species of Trifolium, seventeen in number, also five new species of Streptanthus has segregated two new species from the Apocynum forms of the eastern United States, has described five new species of Eriogonum, has recognized the "hop trefoils" as a good genus bearing the name *Chrysapsis* Desvaux (1827), substitutes *Anthanotis* Raf. for *Podostigma* Ell., and says that *Arafallus* Necker should be used for *Oxytropis* DC. rather than *Spiesia* Necker. A. A. Heller[16] substitutes the generic name Edwinia forthe well known *Jamesia* T. & G. (1840), since Rafinesque has used the latter name in 1832, an unfortunate change which he tries to moderate as much as possible by using the given name of Mr. James. E. Koehne[17] has published further studies of Lythraceæ, among which are included many tropical American forms. C. V. Piper[18] has described a new Rubus from the cañons of Washington, naming it *R. Hesperius.*[19] Carl Purdy has described two new species of Lilium from California and Washington. J. K. Small[20] has described a new oak, *Quercus geminata,* from Florida, also two new species of Celtis, one from Georgia, *C. Georgiana,* the other from Texas, *C. Helleri,* and has published a revision of the species of Gaylussacia in the southern states, recognizing seven species.—J. M. C.

ALBERT KATTEIN, after a study of the development of the vascular bundles of roots and stems, agrees with Van Tieghem and others that the central cylinder of the root is homologous with the bundle complex of the stem rather than with a single bundle, as held by Russow and DeBary. It follows that the pith of the central cylinder when present is homologous with that of the stem in dicotyledons.[21]—C. R. B.

ONE OF THE most interesting papers that has recently appeared is a consideration by Stahl of the cause of nyctitropic and related movements.[22] The author believes that the common view advanced by Darwin, that the movements are to prevent the radiation of heat, can scarcely be the chief cause.

[12] Garden and Forest **10**: 433. 1897. [13] *Ibid.* 453.

[14] Botanical contributions from my herbarium **1**: 1–4. 1897.

[15] Pittonia **3**: 199–230. 1897.

[16] Bull. Tor. Bot. Club **24**: 477. 1897. [19] *Ibid.* 103–105.

[17] Engl. bot. Jahrb. **23**: 17–36. 1897. [20] Bull. Torr. Bot. Club **24**: 438–445. 1897.

[18] Erythea **5**: 103. 1893. [21] Bot. Centralbl. **72**: 55. 1897.

[22] Ueber den Pflanzenschlaf und verwandte Erscheinungen. Bot. Zeit. **55**[1]: 71–109. 1897.

Stahl regards nyctitropic and other related leaf movements to be most intimately connected with the process of transpiration or, in other words, the conduction of solutions from the soil. This view is supported by a large number of facts that are admirably brought into harmonious relationship with each other. True nyctitropic movements are believed to facilitate nocturnal transpiration; in accordance with this view Stahl finds that the stomata of these plants are open at night, and that the leaves, on account of their vertical position, are much less strongly bedewed than are ordinary horizontal leaves. The absence of dew, of course, facilitates transpiration, and the loss of water is still further favored by the fact that the leaf surface most fully provided with stomata is best concealed from the dew.

Some of the tropical plants, especially legumes, assume the vertical or profile position in strong sunlight. In such cases the movements are undoubtedly to reduce the transpiration, since the danger here is from too great, not too little loss of water. The autonomous movements of *Desmodium gyrans*, which have been hitherto unexplained, are thought to be for the purpose of promoting transpiration, since the movements cause the saturated air to be driven off, thus allowing dry air to come in contact with the transpiring surface. The quaking aspen and other poplars may secure the same results by means of the passive movements of their leaves.

Stahl thus associates all variation in leaf movements in one way or another with transpiration, and the predominantly tropical distribution of plants that show such movements is a strong point in favor of this view. It is a striking fact that the Leguminosæ furnish the larger proportion of plants, and Stahl hints that as they have worked out such delicate apparatus to regulate the transpiration, a condition resulting, perhaps, in a more uncertain food supply, so the strange rhizobium symbiosis, characteristic of the family, may have been assumed to supply the deficit of nitrogen.—H. C. C.

KOHL HAS BEEN carrying on studies in order to ascertain the photosyntactic energy of light of various colors.[23] Engelmann's observations showed that the energy of absorption is a mark of the energy of photosyntax. Kohl accepts these results and conducts experiments on algæ placed in darkened chambers covered with colored glasses. He finds that red light permits about 50 per cent. of the photosyntax of white light, blue light nearly as much green light about 25 per cent., yellow light 12 per cent., and violet still less. The results from blue light are surprisingly large, and are hard to interpret in connection with Sachs' well-known experiments.—H. C. C.

DR. A. J. EWART'S paper[24] on the evolution of oxygen from colored bacteria details some interesting results. He finds that a considerable number

[23] Ber. der deutsch. bot. Ges. 15: 361–366. 1897.

[24] Jour. Linnean Society 33: 123.

of the chromogenic bacteria have the power of evolving oxygen. This is demonstrated in the following manner: A small quantity of the chromogene to be tested is placed on a cover glass, and to this is added a drop of fluid but cool gelatin. When solidified a drop of water containing actively motile aerobic organisms is also added, and the whole at once covered. If certain chromogenic bacteria are used, the motile forms in close proximity to the gelatin will continue to move for hours, whereas such movement is suspended in a few minutes if no chromogenic culture is added. Further proof that the evolved gas is oxygen is shown by the ability of the gas to reoxidize reduced indigo carmine. The addition of $HgCl_2$ stops the evolution, and as it occurs in darkness, it cannot be regarded as a photosyntactic product. Ewart arrives at the conclusion that the evolution is a purely physical process, the bacterial pigment having the power of absorbing oxygen, then gradually evolving it again. The oxygen is held in much the same way as it is in oxyhaemoglobin. The biological significance of this process is a question asked but unanswered.

The chlorophyllose and purple bacteria are also considered in relation to their oxygen evolving properties. Engelmann's proof for the evolution of oxygen from these green bacteria was by exposing them to cultures of some spirillum, but Ewart claims to have been able to isolate chlorophyll from cultures of these forms. He also shows that the purple bacteria likewise have photosyntactic powers, although this property is not marked. The conclusion is that the evolved oxygen in these cases is the result of photosyntactic activity.—H. L. RUSSELL.

THREE STATION bulletins of recent date having botanical interest are the following: J. C. Whitten (Mo. no. 38, pp. 140–164) shows with excellent data that the winter killing of the flower buds of peach may be greatly lessened by shading the tree with board or cloth screens, or by covering the branches with whitewash. One cuts off the direct rays of the sun, and the other reflects them. The former is especially effective, while the latter saved 80 per cent. of the buds when only 20 per cent. survived unprotected. J. F. Duggar (Ala. no. 87, pp. 459–488) gives the result of inoculating the soil for vetch, peas, clover, lupine, and other leguminous plants, with soil in which such plants had previously grown and with the imported commercial article, known as nitragin, in both pot and field culture. Results largely favored the inoculated plants. P. H. Rolfs (Fla. no. 41, pp. 517–543) announces the occurrence in Florida, and possibly in California, of an important fungous parasite of the very destructive San Jose scale insect. It is *Sphaerostilbe coccophila* Tul., native of warm countries, United States and elsewhere. It clears the tree of insects more thoroughly than any artificial means so far devised. The infection is easily disseminated from both natural and laboratory grown material.—J. C. A.

A BULLETIN (no. 9), prepared by Professor L. H. Pammel, has just been issued by the government Division of Agrostology. It deals with the grasses and forage plants of Iowa, Nebraska, and Colorado. The three divisions of the bulletin deal with the following subjects: General observations upon the physical conditions and other important questions in reference to forage in these states; a list of the more important grasses and forage plants of the region; and a list of the grasses of the three states collected by Professor Pammel during 1895 and 1896.—J. M. C.

DR. SMITH ELY JELLIFE has published in the *Journal of Pharmacology* (Nov.) a very useful paper entitled "On some laboratory molds." It deals with the more common molds and yeasts in a descriptive way, text cuts being used, and analytical keys provided. The purpose is to aid in the rapid identification of such forms as may arise in connection with the various laboratory cultures.—J. M. C.

THE INTEREST in mushrooms and mycophagy generally is not very widespread in the United States. Those acquainted with the real nutritive and gastronomic worth of fleshy fungi wonder that they do not become a standard food for both rich and poor. Every aid toward this end should be heartily welcome. The last contribution to the subject is a bulletin (no. 138) from the Cornell Experiment Station, by Geo. F. Atkinson,[25] which gives a very full account of two common mushrooms, *Agaricus campestris* and *Lepiota naucina*, and of a poisonous species, *Amanita phalloides*. The attempt has been made to give such clear, detailed and untechnical descriptions of these plants, aided by carefully prepared illustrations, that the novice may identify them with reasonable certainty, and moreover find himself attracted toward the subject. All but two of the cuts are from photographs, and more perfect illustrations in black and white could hardly be made.—J. C. A.

[25] GEO. F. ATKINSON, Studies and illustrations of mushrooms. Bull. Cornell Exper. Sta. no. 138, pp. 337–356, *figs. 27*. Ithaca, September 1897.